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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,068

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EXAMINER

TRIEU, THAI BA

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,068	Applicant(s) TURNER, JAMES WILLIAM GRIFFITH	
	Examiner THAI BA TRIEU	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02/19/2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,8,15,16,26,29 and 30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,8,15,16,26,29 and 30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 19, 2009 has been entered.

Applicant's cooperation in amending the claims to overcome the claim objections relating to informalities as well as indefinite claim language is also appreciated.

Claims 1, 15, 26, and 29-30 were amended; and

Claims 5-14, and 17-25 were cancelled.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the ***“fuel delivery means”*** (See Claims 1 and 29); ***“actuator means”*** (See Claim 1), and ***“electronic controller”*** (See Claim 1) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure

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number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 1, 4 and 29 are objected to because of the following informalities:

- In claim 1, line 1, ***"In a turbocharged internal combustion engine including..., the improvement in the turbocharged internal combustion engine comprising:"*** should be replaced by -- ***A turbocharged internal combustion engine including ..., wherein the improvement in the turbocharged internal combustion engine comprising: – (Drafting a claim in Jepson format (i.e., the format described in 37 CFR 1.75(e); see MPEP § 608.01(m)).***
- In claim 4, line 4, -- ***said*** – or – ***the*** – should be inserted before ***“inlet valve means”*** (for addressing double recitation).

- In claim 4, line 9, the recitation of ***"intake valve means"*** should be replaced by -- **inlet valve means**-- (*for consistency*).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 and its dependent claims 2-4, 15-16, 26, and 29-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1. In claim 1, lines 44-45, the recitation of "variation of opening and closing of the first exhaust gas valve relative to the second exhaust --- with changes in engine speed" renders the claim indefinite, since it is not clear that to which second exhaust component(s), such as valve, passage, flow, turbocharger, turbine, is/are to be referenced/to be in relative to first exhaust gas valve. Applicant is required to identify the second exhaust gas component(s) or to revise the claimed features.

Temporarily, the second exhaust valve is treated in claim 1.

2. In claim 4, line 4, the recitation of ***"inlet valve means"*** is double recitation in claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi Yamane (Patent Number JP 61-164039 A), in view of Yasuyuki Santo (Patent Number JP 01-285619 A).

Takeshi Yamane discloses a turbocharged internal combustion engine (1) including:

a variable volume combustion chamber (2);

inlet valve means (20, 21) controlling flow of air into the combustion chamber (2);

exhaust valve means (22, 23) for controlling flow of combusted gases from the combustion chamber (2);

a fuel delivery means (Not Shown, Well-known components of the internal combustion engines) for delivering fuel into the air to be mixed therewith for combustion;

exhaust valve means (22, 23) for controlling flow of combusted gases from the combustion chamber (2);

compressor means (5B, 6B) for compressing the air prior to admission of the air into the combustion chamber (2);

actuator means (Not Shown, Well-known components Of the internal combustion engines) for opening and closing the exhaust valve means (22, 23); and

an electronic controller (Not Shown, Well-known components of the internal combustion engines) which controls operation of the actuator means (Not Shown, Well-known components of the internal combustion engines) to thereby control opening and closing of the exhaust valve means (22, 23), wherein the improvement in turbocharged internal combustion engine (1) comprising:

the exhaust valve means (22, 23) including at least a first exhaust valve (22) connected to a first exhaust duct (24) and at least a second exhaust valve (23) connected to a second exhaust duct (25) separate and independent from the first exhaust duct (24);

the compressor means (5B, 6B) including a first turbocharger (5A) and the first exhaust duct (24) being connected to the first turbocharger (5A) so that exhaust gases passing through the first exhaust duct (24) drive the first turbocharger (5A) to rotate;

the second exhaust duct (25) bypassing the first turbocharger (5, 5A) and the combusted gases flowing through the second exhaust duct (25) being exhausted without passing through the first turbocharger (5, 5A); and

the first and second exhaust valves (22, 23) being operable to control flow of the combusted gases leaving the combustion chamber (2) flow through each of the first and second exhaust ducts (24, 25);

the compressor means (5B, 6B) additionally including a second turbocharger (6, 6A, 6B) receiving charge air for compression by the second turbocharger (6, 6A, 6B);

the engine having a first operation condition, wherein the first turbocharger (5, 5B, 5A) is a high pressure turbocharger and the first turbocharger (5, 5B, 5A) being configured to receive compressed air at a first pressure from the second turbocharger (6, 6B, 6A), the second turbocharger (6, 6B, 6A) being a low-pressure turbocharger, and the first turbocharger (5B) being configured to compress the compressed air from the second turbocharger to a second higher pressure;

combusted gases leaving the first turbocharger (5, 5B, 5A) after expansion in a turbine (5A) thereof being combined with the combusted gases flowing in the second exhaust duct (25) and then the combined flow of combusted gases driving the second turbocharger (6, 6B, 6A) to rotate;

all exhaust gases passing through the first exhaust gas duct flowing through the first turbocharger (5, 5B, 5A) prior to flowing the second turbocharger (6, 6B, 6A) in the first operating condition (See Page 6, lines 12-19 of a translation copy) (See Page 6, lines 1-8 and 12-19 of a translation copy);

(Re. 3) a first intercooler (10) through which air compressed in the second low pressure turbocharger (6, 6B, 6A) passes before reaching the first high pressure turbocharger (5, 5B, 5A) (See Figure 1-2 and 4, and Abstract); and

(Re. 15) the engine having a first combustion mode and a second combustion mode, fuel being mixed with air in the first combustion mode to produce homogenous mixture which is then ignited by homogeneous charge compression ignition and fuel being ignited by compression ignition in the combustion chamber in said second combustion mode.

Note that the recitation of “fuel being mixed with air in the first combustion mode to produce homogenous mixture which is then ignited by homogeneous charge compression ignition and fuel being ignited by compression ignition in the combustion chamber in said second combustion mode” is considered as the functional language. Takashi Yamane discloses all the structural components of an engine system, which are read on those of the instant invention. Therefore, the Takashi Yamane system is capable of performing the same desired functions as the instant invention having been claimed in claim 15.

Takeshi Yamane discloses the invention as recited above; however, Takeshi Yamane fails to disclose the proportion of the flow of exhaust gas which flows through the first turbocharger being varied by variation of opening and closing of the first exhaust valve relative to the second exhaust gas valve means with changes in engine speed with changes in engine speed; and a catalytic converter and its location.

Yasuyuki Santo teaches that it is conventional in the supercharged internal combustion engine art, to utilize the proportion of the flow of exhaust gas which flows through the first turbocharger being varied by variation of opening and closing of the first exhaust valve relative to the second exhaust gas valve means with changes in engine

speed with changes in engine speed (See Claim, lines 1-6; Page 3, lines 17-34) ; and a catalytic converter (15) receiving combusted gases leaving the second turbocharger then to atmosphere (See Figure 1).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the proportion of the flow of exhaust gas which flows through the first turbocharger being varied by variation of opening and closing of the first exhaust valve relative to the second exhaust gas valve means with changes in engine speed with changes in engine speed, and a catalytic converter and its location, as taught by Yasuyuki Santo, to optimize the exhaust gas to rise to the maximum supercharging pressure of the high pressure turbocharger with almost no time lag and to reduce exhaust emissions for the Takeshi Yamane device.

Claims 4, 26 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi Yamane (Patent Number JP 61-164039 A), in view of Yasuyuki Santo (Patent Number JP 01-285619 A), and further in view of Yuji Hirabayashi (Patent Number JP 61-277818 A).

The modified Takeshi Yamane device discloses the invention as recited above, and further discloses the compressor means comprising additionally an intercooler (10) for cooling the compressor intake air prior to delivery of the air into the combustion chamber (2) (See Figures 1-2 and 4);

wherein the fuel delivery means (Not Shown, Well-known components of the internal combustion engines) delivers fuel into the combustion chamber (2)

early enough in an upstroke for mixing of the fuel with air to produce a homogeneous mixture which is then ignited by homogenous charge compression ignition and wherein the fuel delivery means (Not Shown, Well-known components of the internal combustion engines) alternatively delivers fuel later in the upstroke for compression ignition in the combustion chamber.

However, the modified Takeshi Yamane device fails to disclose an intake air bypass passage having a bypass valve.

Hirabayashi teaches that it is conventional in the art of multistage type turbo-supercharged internal combustion engines, to utilize a bypass passage (from 5 to 18) having a bypass valve (7) controlling flow of air through the bypass passage and the engine has a second operating condition in which air flows through the bypass passage bypassing the first high pressure turbocharger; and all air received by the combustion chamber is compressed first by the first turbocharger (See Figures 1-2, Abstract).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized a bypass passage having a bypass valve, as taught by Hirabayashi, to improve the efficiency of the modified Takeshi Yamane device, since the use thereof would have controlled the compressed intake air to be delivered into the engine based on the operating condition of the engine.

Note that the recitation of “wherein the fuel delivery means delivers fuel into the combustion chamber early enough in an upstroke for mixing of the fuel with air to produce a homogeneous mixture which is then ignited by homogenous

charge compression ignition and wherein the fuel delivery means alternatively delivers fuel later in the upstroke for compression ignition in the combustion chamber” is considered as the functional language. Takashi Yamane discloses all the structural components of an engine system, which are read on those of the instant invention. Therefore, the modified Takashi Yamane system is capable of performing the same desired functions as the instant invention having been claimed in claim 29.

Additionally, when a claim includes a 'whereby' clause or similar clause, it must contain, in order to be complete, an enumeration of sufficient elements to perform the function so specified in such clause. A "whereby" clause is not objectionable. It merely states the result and adds nothing to the patentability of a claim (*Israel v. Cresswell*, 76 USPQ 594; *In re Boileau*, 1948 C. D. 83).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi Yamane (Patent Number JP 61-164039 A), in view of Yasuyuki Santo (Patent Number JP 01-285619 A), and further in view of either Lovell (Patent Number 3,202,141) or Gray (Patent Number 6,550,430 B2).

The modified Takeshi Yamane device discloses the invention as recited above; however, the modified Takeshi Yamane device fails to disclose the exhaust valve means being closed to trap combusted gases forming a mixture with the fuel and air and serving to delay ignition of the fuel and air mixture when the engine is operating in the first combustion mode with homogenous charge compression ignition.

Lovell/Gray teaches that it is conventional in the art of operating compression ignition engine, to utilize in part loading operating conditions of the engine, the exhaust valve means being closed during the upstroke of the piston in order to trap combusted gases in the combustion chamber, the trapped combusted gases forming a mixture with the fuel and air and serving to delay ignition of the fuel and air mixture when the engine is operating in the first combustion mode with homogenous charge compression ignition (Column 3, lines 27-54, Column 7, lines 74-75, and Column 8, lines 1-8 of Lovell; Column 2, lines 25-45, Column 3, lines 62-67, Column 4, lines 1-21, Column 6, lines 59-67, Column 7, lines 1-4 and 27-42, Column 13, lines 25-67, Column 14, lines 36-53, Column 15, lines 4-10 and 32-51 of Gray).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the exhaust valve means being closed to trap combusted gases forming a mixture with the fuel and air and serving to delay ignition of the fuel and air mixture when the engine is operating in the first combustion mode with homogenous charge compression ignition, to improve the efficiency of the modified Takeshi Yamane device, since the use thereof would have controlled the desired air-fuel ratio for operating the engines.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi Yamane (Patent Number JP 61-164039 A), in view of Yasuyuki Santo (Patent Number JP 01-285619 A) and Yuji Hirabayashi (Patent Number JP 61-

277818 A), and further in view of either Lovell (Patent Number 3,202,141) or Gray (Patent Number 6,550,430 B2).

The modified Takeshi Yamane device discloses the invention as recited above; however, fails to disclose the exhaust valve means being closed to trap combusted gases forming a mixture with the fuel and air and serving to delay ignition of the fuel and air mixture when the engine is operating in the first combustion mode with homogenous charge compression ignition.

Lovell/Gray teaches that it is conventional in the art of operating compression ignition engine, to utilize in part loading operating conditions of the engine, the exhaust valve means being closed during the upstroke of the piston in order to trap combusted gases in the combustion chamber, the trapped combusted gases forming a mixture with the fuel and air and serving to delay ignition of the fuel and air mixture when the engine is operating in the first combustion mode with homogenous charge compression ignition (Column 3, lines 27-54, Column 7, lines 74-75, and Column 8, lines 1-8 of Lovell; Column 2, lines 25-45, Column 3, lines 62-67, Column 4, lines 1-21, Column 6, lines 59-67, Column 7, lines 1-4 and 27-42, Column 13, lines 25-67, Column 14, lines 36-53, Column 15, lines 4-10 and 32-51 of Gray).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the exhaust valve means being closed to trap combusted gases forming a mixture with the fuel and air and serving to delay ignition of the fuel and air mixture when the engine is operating in the first combustion mode with homogenous charge compression ignition, to improve the efficiency of the modified

Takeshi Yamane device, since the use thereof would have controlled the desired air-fuel ratio for operating the engines.

Response to Arguments

Applicant's arguments filed August 26, 2008 have been fully considered but they are not persuasive. Accordingly claims 1-4, 8, 15-16, 26, and 29-30 are pending.

1. DRAWINGS:

In response to the applicant's arguments on page 6 with respect to the objections to the drawings, applicant states that "the drawings are objected as not showing the "fuel delivery means," "actuator means," and "electronic controller." These terms have been moved from the body of the claim 1 to the preamble, so that these elements are not recited as claimed elements, and it is believed that the objections to the drawings can now be withdrawn.

The examiner respectfully disagrees.

Applicant has moved theses elements of "fuel delivery means," "actuator means," and "electronic controller" from the body of the claim 1 to the preamble to format the claim in "***Jepson format***" because all of the elements in the preamble are to be considered as conventional /well-known ones in the invention/art.

However, actuator means and electronic controller will work in different manners which depend upon the mode of engine operating conditions or the requirement/design/arrangement of the engine.

Additionally, one of those elements, such as delivery fuel means, has been recited in the body of claim 29.

Accordingly, for these reasons, the objection of the drawings should be maintained.

2. Rejections under 35 U.S.C. §102 (b)

.Applicant's arguments with respect to the recitation of "variability in terms of the opening of one exhaust valve relative to the other with changes in engine speed" in claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THAI BA TRIEU whose telephone number is (571)272-4867. The examiner can normally be reached on Monday - Thursday (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TTB
February 27, 2009

/Thai-Ba Trieu/
Primary Examiner
Art Unit 3748